**TIGERS**

TIGER, NO LAUGHING JOKE

How is a tiger's face like your thumb?

ANSWER: The stripes on the tiger's face are like your thumbprint. No two people have exactly the same thumbprint. And no two tigers have exactly the same stripe pattern.

It takes a lot of muscle to move a 400-pound body (180 kilograms). And a tiger's body is packed with muscle. So it can leap 10 yards (9 meters) over level ground, or jump 15 feet (4.5 meters) in the air. Yet it can move so gracefully that it doesn't make a sound.

Tigers are big-game hunters. They hunt water buffalo, wild pigs, deer, and other large animals. Water buffalo weigh more than a ton (900 kilograms). It would take 13 men to move such an enormous weight.

Tigers are also big eaters. In a single year, one tiger must eat about 70 deer or other large animals. That is one reason why tigers hunt alone. If they lived in big groups, they could never find enough prey to feed them all.

Many people think that a big, dangerous tiger could easily kill all the prey it wants. But that's not true. In fact, the life of this big game hunter isn't easy. Most of the animals it tries to attack get away. It sometimes goes weeks without eating. And then it may hunt animals that can be dangerous, even for a tiger.

To get enough food, tigers have to hunt day and night. They often hunt at night, because that's when deer and antelope are most active. Tigers also hunt at night because they are safe from humans then.

When it hunts, a tiger usually sneaks close to its prey by hiding behind trees, bushes and rocks.

Tigers cannot run fast for long distances. So they must get close to their prey before attacking. On their huge, padded feet, they can creep silently to within 20 feet (6 meters) of another animal without being heard. Its rear legs press beneath it, like a pair of giant springs about to be released.

Then, in a series of explosive leaps, it attacks from behind.

Next, the tiger grabs its prey with its claws and pulls it to the ground. It bites the animal on the throat or on the back of the neck

The tiger has had a long history; the name tiger itself comes from the Roman word "Tigris", named after the mighty Mesopotamian Tigris River. The tiger's closest living relative is the lion, and believe it or not, they can even be interbred. The male tiger can reach sizes of up to 8-10 feet in length, with three feet for the tail, the male Siberian tiger can reach lengths of up to 13 feet with weights up to 750 pounds. Tigers can be found in a fairly diverse area, from north China and Siberia, to the jungles of Indonesia, even as far west as Iran and the Caucasus Mountains.

The tiger is a solitary animal, hunting mainly at night. The tiger's vision and sense of smell are relatively poor; the tiger will rely strongly on its sense of hearing, moving silently through the brush waiting to ambush its prey. The tiger's main diet consists of deer, antelope, wild pigs, and cattle. The man-eaters are all too often the sick and injured, too weak to hunt and capture wild animals. The tiger would much rather flee rather than stick around and put up a fight.

Tigers are excellent swimmers and will often rest in pools of water just to escape the heat, or, will swim from island to island such as in the Sumatran islands. Tigers are poor tree climbers, often only doing so in emergencies or when they are young, (and on occasion, just out of curiosity). The Bengal, or, Indian Tiger is the

SIBERIAN TIGER

The largest of all living tigers lives in the coldest climate; but has thick fur to keep it warm. Its pale color makes it difficult to spot in the bleak, snowy landscape of Siberia and also makes it easier to get close to its prey. There are no more than 200 Siberian tigers living in the wild.

INDIAN TIGER

The Indian tiger is the most common tiger in the world today. In all, there are about 2,500 left, and most of them live in India.

Hunting tigers used to be a sport for the rich people of India. But it wasn't really a sport, because the tigers had little chance of escape. The hunters rode on elephants, while their servants drove the tigers toward their guns. Over the years, thousands and thousands of tigers were killed this way.

SUMATRAN TIGER

Their stripes hide them as they stalk prey in the jungle. How? Their stripes look like the shadows of tall blades of grass, or like shadows and light playing across trees.

For a fierce hunter, you'd think that food would be plentiful. Not true as most attacks fail. There may be weeks without eating.

Some Sumatran villagers believe that the tiger holds magical powers and that it's very bad luck to kill them.

 SUMATRAN TIGER

Tigers are among the most admired and most feared animals in the world. When we think of tigers, we think of danger. We think of powerful beasts hiding in the dark jungle. We think of the strong jaws, big teeth, massive feet, and long, sharp claws of the tiger.

But we also think of beauty. We picture a tiger running swiftly through a jungle, or plowing through snowdrifts. Its muscles ripple. Its brilliantly striped orange and black coat gleams like satin. Its steely eyes glare into the distance as it looks for prey.

This animal is a hunter. In fact, tigers are probably better than any other land animal at capturing large prey single-handedly. Even so, the life of a tiger is not easy. Finding food can be difficult, especially for a tiger that is old or weak.

When they are desperate, some of them may even attack humans. But tigers also get blamed unfairly for many deaths. Very few people are really killed by tigers each year. Most tigers run away when they see people. And with good reason.

What tigers have done to people is nothing compared to what people have done to tigers. Over the last 200 years, we have almost eliminated them in the wild. Today, they are one of the most endangered animals on earth.

If humans do not disturb it, a tiger may live 20 years or more. Females usually live longer than males, because the males live more dangerously. They often fight among each other. Sometimes one of them is killed this way, or wounded so badly that it cannot hunt.

It isn't easy for people to tell a male tiger from a female, unless the female happens to be with her cubs, because only females take care of the young. Otherwise, the most obvious difference between males and females is size. Male tigers are much bigger. An adult male Bengal or Indian tiger usually weighs about 420 pounds (190 kilograms), and from head to rear, it is roughly seven feet long (2 meters). Females are about a foot shorter (30 centimeters), and they weigh about one hundred pounds less (45 kilograms). Sumatran tigers are generally smaller than Indian or Bengal tigers. The biggest tiger ever measured was a male Siberian Tiger. It was over 9 feet long (2.6 meters) and weighed more than 700 pounds (320 kilograms).

Tigers once roamed over most of Asia. Some trekked over the frozen north, others climbed the jagged mountains of Central Asia, and many crept through the steamy jungles of the south. The tigers that lived in these different places gradually developed into a number of different types, or races.

Although tigers have been able to live in different climates and landscapes, they have not been able to live alongside people. In fact, people have killed so many tigers that two races may already by extinct.

The Bengal tiger is the most common tiger in the world today. In all, there are about 2,500 Bengal tigers, and most of them live in India. The Caspian tiger is one that you will only see in pictures. This beautiful cat is now extinct. The Chinese tiger used to live in most parts of China. Today, there are fewer than a hundred Chinese tigers in the whole country.

The Siberian tiger is the largest of all living tigers. It also lives in the coldest climate, but it has very thick fur to keep it warm. And its pale color makes it hard to see in the bleak, snowy landscape of Siberia. This makes it easier to get close to its prey. There are no more than 200 Siberian tigers living in the wild.

Sumatran and Javan tigers live on land south of the Asian continent. Their islands are covered by heavy, tropical jungles. To help them run and hide in the jungle, these tigers are smaller than other tigers. Today, there are fewer than 30 Sumatran and Javan tigers left in the wild.

The body of a tiger is like a deadly weapon. It has the quickness and strength to take down animals twice its size. It has long, razor-sharp claws for grabbing its prey. And it has enormous teeth, which can easily kill large animals.

But a tiger is also very quiet. It can sneak up on its prey without being seen or heard. And its stripes help it do this, because they make it easier for the tiger to hide. You will also discover another reason why a tiger's stripes are interesting. You can learn to tell one tiger from another by its stripes.

 Like other cats, tigers usually keel their claws hidden beneath the fur. This way the claws do not wear down too quickly. And they won't make noise when the tiger steps on rocks or hard ground. When it wants to use its claws for grabbing or scratching, the tiger will extend them.

Tigers have longer canine teeth than any other predator. One of these teeth is at least 10 times longer than the biggest tooth in your mouth. Using its big canine teeth and its broad, powerful paws, a tiger can kill its prey with one quick bite.

CUB LIFE

Tigers and other predators play an important role in nature. By killing deer and other prey, they keep the numbers of these animals under control. And because of this, the animals that survive are healthier.

If there were no tigers in the wild, the number of prey animals would grow too fast. At first, they would eat so much that they would destroy many plants. And then many of these animals would go hungry.

A big, hungry tiger can eat about 100 pounds of meat (45 kilograms) at one sitting. This is about one fifth of its total weight. That would be like a 10-year-old human eating 40 hamburgers in one meal. Of course, a tiger has to eat this much because it often goes several days without eating anything.

On occasion, a tiger will attack a baby rhino. This can be dangerous though, because the mother rhino is probably close by. And even a tiger does not want to make a four-thousand-pound rhino (1,800 kilograms) angry!

If a tiger is hungry enough, it may even attack a bear. But that may be a big mistake.

Baby tigers look like cute kittens. At birth, they are about 12 inches long (30 centimeters), and they weigh less than two pounds (one kilogram). But in a year's time, these "kittens" will be big enough to hunt deer and buffalo.

A mother tiger usually gives birth to two, three, or four cubs at a time. This is necessary so that at least one of her cubs will survive. Many predators attack tiger cubs. To help keep them safe, the mother stays with her cubs for three or four years. During this time, the young tigers have a lot to learn from her if they are to hunt and survive on their own.

Animals, unlike man, must either capture prey, or, evade predators. In order for these animals, such as the tiger, to get close enough to its prey for the attack, these animals must be able to hide, or blend in with the background. That way the prey animal does not know that they are there…

The tiger uses what is known as disruptive camouflage, which means that instead of blending in with it's surroundings, the tiger uses it's stripes to break it's outline, or familiar shapes into smaller unfamiliar shapes.

Like all young animals, cubs are full of energy. They spend their days wrestling, chasing each other, and darting after butterflies. All this exercise helps prepare them for their first real hunt. And they are ready for this when they are about six months old.

It's hard to believe that in just six months, a playful little cub will be a ferocious hunter. By then, it will weigh almost 200 pounds (90 kilograms) and have four big canine teeth for attacking prey.

A female tiger is one of the most loving and caring mothers in the animal kingdom. She cuddles her babies to keep them warm. She feeds them and protects them from enemies. For three years or more she looks after them, teaching them how to hunt and survive in the wild.

This cub is only a few weeks old. In the wild, cubs are usually born in caves and other protected places. The mother keeps them there and brings them food for about three months. After that, the cubs are big enough to follow her as she hunts for prey.

The life of a baby tiger can be dangerous. If a mother leaves her cubs, even for a short time, they may be attacked by predators. Some of the animals that like to eat tiger cubs are leopards (left), pythons (below left), and hyenas (below right).

**LEOPARDS**

CLOUDED LEOPARD: PRECIOUS CARGO

One chapter in the Zoological Society's clouded leopard story began early in 1983 with the arrival of a young pair of cats from the People's Republic of China. The cats were a welcome addition to the Society collection. Staff prepared a plan to encourage successful breeding, but unfortunately, tragedy occurred before the plan could be implemented.

In the exhibit, the female was accidentally exposed to a male, which severely mauled her right foreleg and shoulder. The injury was so severe that, because of the initial trauma and resulting fast-spreading infection, amputation of the leg and affected scapula were required to save her life.

The difficult surgery was masterfully conducted. Intensive care was required for more than two months. The veterinary staff and a hospital team kept the cat alive through repeated tube-feeding and frequent hands-on care, despite the cat's aggressive distrust of such treatment. Following many weeks of this regimen, the cat responded and made sufficient recovery to allow her return to the leopard exhibit.

A primary hurdle had been cleared -- the female had survived the injury. Next to be resolved were her adjustments to life on three legs and finding a method which would allow her reintroduction to the Chinese male.

First, the mammal staff placed the cat in a program designed to help her grow accustomed to life with three legs. After several months of satisfactory progress, the staff decided to place her with the male, who had been kept in a separate but adjoining room. The animals were allowed to make contact as they chose. To the relief of all, the reintroduction was successful. The cats proved to be compatible, and, shortly after reintroduction, breeding took place.

On the morning of April 25, 1984, final proof of the success of a long and difficult management program arrived-- a litter of two cubs. One cub did not survive, but the other was taken to the Children's Zoo to be raised by the nursery staff.

UNIQUE FELINE

The clouded Leopard has intrigued its public, been sought after for its fur, and mystified those who would try to categorize it. During the early morning hours of April 25, 1984, a discovery was made which was the culmination of a saga, which held elements of zoo diplomacy and goodwill, tragedy and suspense, cooperation and success. The discovery climaxed a chain of events surrounding this paradoxical cat.

This cat has behavioral and physical traits typical of the small cats, genus Felis, and the big cats, genus Panther. A paradox to taxonomists and zoologists, it has been assigned to its own genus, Necrfelis, and is considered a bridge between the two larger genera. A relationship to the extinct saber toothed cat has even been suggested, based on the physical characteristic of having, in proportion to body size, the longest canines of all living felines. Its canine structure is also similar to that of the saber-toothed cat.

The clouded leopard has a body size ranging from 24 to 42 inches (616-1,066 mm) Its tail adds another 21 to 36 inches (550-912 mm) of length. This leopard's weight falls between 35 and 50 pounds (16-23 kg). Its fur is grayish brown to tawny yellow and has dark markings in a variety of shapes, which seem to form cloudlike patterns.

 The clouded leopard was once believed to be exclusively arboreal and nocturnal. Recent observations in captivity and in the wild indicate, however, that it may be considerably more terrestrial and diurnal than previously thought. It is believed to prey upon birds, young buffalo, cattle, deer, goats, monkeys, pigs, and porcupines. The species is difficult to manage in captivity because of a tendency to be highly aggressive toward other species and humans. The exceptionally long canine teeth can easily inflict mortal injury. True to its paradoxical reputation, however, some cats may become extremely affectionate toward humans, even permitting and seeking physical contact.

NORTH CHINESE LEOPARD

This leopard is so rare that humans almost never see it in the wild. It roams the forests and mountain meadows of northern China and Korea.

It makes its home in a great tangle of fallen trees and shrubs. When it kills smaller animals it devours them right away. But when it comes to larger prey, like deer and wild goats, the leopard drags the animal home to save for several meals.

Don't be scared. The teeth of this snarling leopard won't hurt you.

On the contrary. It's the snow leopard that should be afraid. Its relatives in the wild are in constant danger from poachers who want to shoot them for their pelts and teeth.

Even though shooting leopards is illegal, it's considered "good business." That's because some people still wear leopard fur coats, and others believe that leopard teeth earrings and necklaces have special powers.

SNOW LEOPARD: COLD WEATHER CAT

The shy, nocturnal and virtually unknown Snow Leopard is classified with the big cats, but shares some small cat characteristics, for example it doesn't roar and it feeds in a crouched position.

The Snow leopard has to contend with extremes of climate and its coat varies from fine in summer to thick in winter. The surfaces of its paws are covered by a cushion of hair, which increases the surface area, thus distributing the animal's with more evenly over soft snow and protecting its soles from the cold.

Snow leopards are solitary except during the breeding season, (January to May), when male and female hunt together, or when a female has young. One to four young are born in spring or early summer in a well-concealed den lined with the mother's fur. Initially, the spots are completely black. The young open their eyes at 7-9 days, are quite active by two months, and remain with their mother through their first winter

Snow leopards are extremely rare in many parts of their range due to the demand for their skins by the fur trade. Although in many countries it is now illegal to use these furs, the trade continues and the species remains under threat.

SNOW LEOPARD

They live in the snow-covered mountain peaks of Central Asia. How high do these Asian Mountains rise? They reach 20,000 feet in altitude.

The snow leopard's long, thick fur keeps it warm even in the frosty air, and its creamy white and gray color camouflages it in the snow. Because humans are fond of turning its beautiful coat into coats for themselves, the species is on the brink of extinction.

**HYENS**

SPOTTED HYENA

This hyena is also known as the "laughing" hyena. Sometimes a hyena lets out a cry that resembles a wild human cackle.

Did you know that a hyena can gorge up to 33 pounds of meat extremely fast? It needs to eat fast because as many as 50 other hungry hyenas may be next to it, noisily feeding on the same piece of meat. Scientists have seen 38 hyenas devour a zebra in 15 minutes, leaving only a few scraps behind.

The hyena is famous for eating animal parts that other meat-eaters won't touch. You might even see it stamping and biting on an ostrich egg, trying to eat it. After devouring everything in sight, the hyena spits out the horns, hooves, and bone pieces, ligaments and hair. If there are leftovers, it buries the meat in a muddy pool. The hyena's good memory leads it back to the hidden food when it's hungry again.

The spotted hyena hunts at night. Hyenas were once thought to be just scavengers (animals that eat the meat left behind by predators). But now we know that they're very good at finding their own food, too.

Hunting together in large packs, hyenas have a very effective way of catching their favorite food. One hyena scares a herd of wildebeest, looks for the weakest member of the herd, and then begins a chase. The other hyenas join in the attack, and a wildebeest feast is soon ready.

If you've ever heard the expression "laughing hyena" and wondered where it came from, it was inspired by the strange, laughter-like sound hyenas make when they're being attacked or chased.

EATING HABITS

True hyenas have thickset muzzles with large ears and eyes, powerful jaws and big cheek teeth to deal with a carnivorous diet. They walk on four-toed feet with five asymmetrical pads and nonretractile claws. The tail is long and bushy (less so in the spotted hyena). Spotted hyenas will eat almost anything, but in the wild much of their food comes from mammals heavier than 44 lb. which they mostly kill for themselves. The frequency of hunting depends on the availability of carrion; spotted hyenas will loot the kills of other carnivores, including lions. Group feeding is often noisy, but rarely involves serious fighting. Instead, each hyena gorges extremely rapidly on up to 33 lb. of flesh. Pieces of a carcass may be carried away to be consumed at leisure or, occasionally, stored underwater.

It seems that the success of spotted hyenas is ensured through individual and cooperative hunting and sharing of food between adults. Cooperation also extends to communal marking and defense of the territory, in which both sexes play a similar role, whether or not they are related. Competition within the clan can, however, be intense. The system of communication shows adaptations, which reduce aggression and coordinate group activities. Such competition probably provided the selection pressure whereby females evolved their large size and dominant position, which in turn relates also to levels of testosterone in the blood that are indistinguishable from those of the male. Thus female spotted hyenas are able to feed a small number of offspring alone and protect them from the more serious consequences of interference by other hyenas, particularly unrelated males.

WHY THEY LAUGH

Hyenas are often called "solitary," a label which obscures the fact that their social systems are among the most complex known for mammals. Spotted hyenas employ elaborate meeting ceremonies and efficient long-range communication by scent and sound. Even when moving alone, spotted hyenas maintain some direct contact with their fellows. They respond to sounds, which are only audible to humans with the aid of an amplifier and headphones.

Calls audible to the unaided human ear include whoops, fast whoops, yells and a kind of demented cackle that gives this species its alternative name of laughing hyena. Whoop calls, in particular, are well-suited to long- range communication as they carry over several kilometers; each call is repeated a number of times, which helps the listener to locate the caller, and each hyena has a distinctive voice. Infant hyenas will answer the pre-recorded whoops of their mothers, but not those of other clan hyenas.

**LIONS**

AFRICAN LION: FAMILY CATS

Lions are among the most admired animals on earth. Their strength and beauty, combined with their bold nature, have fascinated people for ages. In fact, the lion has often been called the "king of the beasts." And when you see a big male lion, with its magnificent main and proud walk, it's easy to understand why. Lions really do look like kings.

But lions don't always lead the easy lives of kings. They often need to work hard to survive. Lions are meat eaters, or carnivores, so they must hunt other animals for food. And sometimes prey is hard to find. When food is scarce, a lion may go for days without eating.

Lions are members of the big cat family, which includes tigers, leopards, and jaguars. The main difference between the big cats and all other cats is that generally big cats can roar but cannot purr. Other cats can purr but cannot roar.

The lion is one of the biggest cats in the world. Only the Siberian tiger is larger. A male lion may be 9 to 10 feet long (3 meters) and can weigh 500 pounds (227 kilograms) or more. Female lions are smaller. The average female is 7 to 8 feet long (2 l/2 meters) and weighs 270 to 350 pounds (140 kilograms).

Lions are different from most other cats in that they live in groups called prides. They hunt together, guard their territory together, and raise their young together. Lions that live in groups can catch more food than a single lion can. And they can protect themselves better. Also, lions that are born into groups have a large family to care for them.

There are two different kinds, or subspecies, of lions: the African and the Asiatic. Most of the lions in the world today are African lions. These animals live on the grassy plains of Africa. The few Asiatic lions that remain live on a small wildlife preserve in India. There were once many other kinds of lions in the world but all of these are now extinct.

Lions sometimes climb high up into trees to rest on their branches and escape the biting insects below.

The body of a lion is made for catching prey. Most of the time, lions try to get very close to their prey before they attack it. Then they make a big leap and grab the prey. To help them get close without being seen, lions have golden-brown coats that blend in with the land around them. And to help them leap, they have strong muscles in their legs. A lion can leap 35 feet (10.5 meters) through the air in a single jump.

Lions do most of their hunting at night, so they have wonderful hearing and eyesight to help them find prey in the dark. Their hearing is so sharp, they can hear prey that is more than a mile away. Lions can turn their ears from side to side to catch sounds coming from almost any direction. When a lion is moving through tall grass, it may not always be able to see its prey -- but it can always hear it. The eyes of lions are the biggest of any meat-eating animal. Like the eyes of other cats, they are specially made for seeing at night.

Lions often work together when they hunt. By doing this, they increase their chances of getting food. A lion that hunts alone may have a hard time catching prey.

Most of the hunting is done by a team of females. They divide the job among them, with each female doing part of the work to catch the prey. Some of the females scare prey animals and make them run -- while other females lie in ambush to grab the fleeing animals.

The extra strength of a male is sometimes needed to bring down larger animals, like wildebeest or buffalo. And larger animals are the best prey, because they provide more meat.

No matter how good a lion is at hunting, it misses more prey than it catches. Sometimes lions will go for days without eating. If lions can't find enough of their regular prey, they will eat smaller animals like hares and tortoises -- and even porcupines.

When they can, lions get their food by taking it away from other animals. This is often easier than hunting. In some parts of Africa, much of the food that lions eat is taken away from hyenas. When food is really scarce, lions will eat almost anything they can find -- including snakes, locusts, termites, peanuts, fruit, and rotten wood.

Baby lions are called cubs. And like most baby animals they need lots of loving care. A lion cub is totally helpless at birth. It is blind and can barely crawl. And it weighs less than 5 pounds (2 kg).

Cubs are born in-groups called litters. Usually, there are three cubs in a litter. But sometimes there are as many as five. For the first few weeks of their lives, the cubs stay hidden in a safe place away from the pride. Then their mother brings them out to join the "family."

In a pride, all of the females help take care of the cubs. When one mother is away hunting, the other lions feed and watch over her young. But sometimes, all of the adults join the hunt. Then the cubs are hidden in the tall grass or among the rocks.

A cub is born with dark spots all over its body. Some people think that the spots may make it harder for predators to see the cubs when they are hidden.

A mother lion carries her babies in her mouth -- just like a motherhouse cat. To keep predators from finding the cubs, she moves them to a new hiding place every few days.

AFRICAN LION: FUTURE

Asiatic lions are endangered, and African lions have less living space than in times past. This is because people are taking away their homes, or habitats. The human population in Africa and Asia is rapidly growing, and people are turning more and more land into farms and ranches. This means that the lions have less food to eat and so it is harder for them to live.

Fortunately, wildlife organizations throughout the world are working hard to save the lions' habitats. And governments in both Africa and India have set aside special land where lions can live in safety.

AFRICAN LION: THE MANE CAT

Most experts agree that a lion will attack a human only if provoked. But the experts also suggest that knowledge of the warning signs are mandatory for anyone who travels by foot in the bush. An angry lion will drop to a crouch, flatten its ears, and flick its tail tip rapidly from side to side. Low grunts and growls can often be heard; and just prior to a charge, the tail is jerked up and down. While these warning signs are important, it is perhaps of greater importance that a lion can bolt from a crouch and travel 40 yards in less than 2.7 seconds.

The lion is the largest of the African cats, weighing up to 200 kilograms (440 pounds). Of the big cats, only the tiger is of greater size. The mane of a male lion is the most distinguishing characteristic of the species, although a small percentage of lionesses also have manes. The mane adds to the apparent size of a male lion, and it is believed that the mane provides added protection during male-to-male combat. The mane begins to develop at about one year of age but remains short and scraggly until the male is three or four years old. Another physical characteristic of lions is the tuft of long hairs at the end of the tail. This black tassel occurs in both males and females. Often, when females have cubs or are being courted by males, the tail tassel is carried high above the ground. Researchers believe that this behavior allows cubs or males to maintain visual contact with the female when she moves through dense vegetation. Fortunately for us, it is also an excellent way for humans to maintain visual contact.

LION: NO LONGER KING

You may have believed that African lions are the kings of the jungle. Well, that's just not true. But the reason isn't because lions aren't the lordly animals that you thought them to be; it's just that lions don't live in the jungle. They live in the open savannas in Africa, which are grassy plains with a few scattered trees.

Lions, of course, are big cats, but they're different from tigers, leopards and other big cats because they are very social animals. They live in a group called a "pride," which can have as many as 35 lions in it. Adult female lions, or lionesses, and cubs make up most of each pride, although two or three adult males live in it, too.

Hunting is how the lions get their food. They eat animals such as zebras, gazelles, hartebeests, gnus and even buffalo. Lionesses do most of the hunting but when it comes to eating, the adult males get their share first.

Lions often hunt together. A couple of lions may chase the prey and herd it toward other lions hiding in the grass. Then the hiding lions leap out and ambush the prey.

When lions eat, they often eat a whole lot of meat all at once. It's possible for a wild lion to eat up to 40 pounds of meat at one sitting. But then it may fast for several days and not eat anything. While it's fasting, the lion may be very, very lazy and just sleep a lot ... until its time to eat again.

If you've ever heard the roar of a lion, you know what a thundering sound it is. It's very possible for a lion's roar to be heard five miles away if the wind conditions are right. Lions often roar just after the sun goes down.

Male lions have manes around their necks. A young male will start to grow a mane when he's about a year old. It's believed that the mane helps protect the neck areas of males when they fight with each other.

Baby lions are called cubs. A lioness will usually have three or four cubs in an area protected by rocks or brush. Many animals are born with their eyes closed, but it's possible for a lion cub to be born with its eyes open. The cubs are very playful and love to wrestle and stalk each other. Lionesses often care for each other's cubs, which is a little bit like baby-sitting.

Although African lions aren't an endangered species, there's a lion subspecies that lives in Asia that is very rare and endangered.

So remember: While you may not be able to call a lion the king of the jungle, there's certainly no reason you can't call him the king of beasts.

ASIAN LION

In the past, you could find hundreds of thousands of these lions in the Middle East and Asia. Now, they number only 180, living on a small wildlife preserve in India. Like the African lion, they've suffered from the destruction of wild lands and from over hunting.

Once, people thought that Asian lions had shorter manes than African lions, but that's not the case. Both can have either long or short manes.

**WOLVES**

COYOTE: PLACE IN THE FOOD CHAIN

Every animal on earth lives by eating some other living organism -- plant or animal. The sequence of eaten and eater is called a food chain. The ultimate source of the energy contained in food comes from the sun. It is stored in the grass, and passed on to the grasshoppers. The alligator lizard, which eats the grasshopper, is the next link in the food chain. It, in turn, is eaten by a roadrunner, which then falls victim to the coyote.

The coyote is called an ultimate consumer because nothing hunts it for food.

But this food chain is a closed circle, the final link -- coyote -- being fastened to the first -- the grass. When the coyote dies, its chemicals are broken down by bacteria and returned to the soil, where they nurture more plant growth.

Like many wild dogs, the coyote is usually active at night, when it can hunt safely. You can often see a coyote in the early evening and morning, as it goes to and from its nighttime activities.

Coyotes can run as fast as 40 miles per hour, and at slightly slower speeds, they can run for miles. If a coyote can stay close to its prey, it has a good chance of getting a meal.

DHOLE

In hunting style, the dhole is like the hyena. It hunts in a pack with other dholes, whining, barking and whistling as they go. Whistling usually means that the hunt is unsuccessful, and the pack should reassemble for another try.

It is almost impossible for a single dhole to kill a deer, but five to twelve dholes can manage it together. After the kill, dholes compete for the morsels by eating very fast. A dhole can chew up almost nine pounds of meat in an hour.

Strong, wise, brave -- all these words describe the gray wolf. But another word needs to be added to the list: endangered.

Two hundred years ago, the gray wolf roamed throughout North America. But many of them were shot by European settlers and pioneers, who were busy cutting down the wolves' forest home for houses and towns. Those wolves that remained found fewer deer, moose and beaver to eat.

Today, the gray wolf continues to feel the impact of an expanding human population. That, and the popular belief that wolves shouldn't live near humans, continues to threaten their presence on our planet.

GRAY WOLF

Did you know that the gray wolf is the largest member of the dog family? Apart from man, it once was the most widespread mammal outside the tropics. As humans move into its habitat, the wolf had to move out.

Did you know that after humans, wolves may be the most adaptable creatures of all? They're able to live in a wider variety of climates and habitats than most other animals and can survive on many different kinds of food.

BEST LEFT UNPROVOKED

Wolves prey on many species in the north -- musk ox, caribou, moose, deer, hares and even rodents. These carnivores are among the most maligned of all animals, victims of false myths and legends and systematic programs of extinction. They are accused of attacking humans and destroying entire herds of domestic animals. But their depredations of livestock are less severe than often claimed. And unprovoked attacks by healthy wolves in North America on humans are unknown. Those recorded from Europe's Middle Ages are thought to have been by rabid animals or hybrids.

The world will be a far lonelier place if the last wolf dies. As biologist Ernest P. Walker wrote in his book, MAMMALS OF THE WORLD, "The howl of the wolf and coyote, which to some people is of more enduring significance than superhighways and skyscrapers, should always remain a part of our heritage."

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**PRIMATS**

APES: FUTURE

The future of apes is up to us. All of the great apes are already on the endangered species list, and all of the lesser apes are as well. Scientists who have studied them agree that all great apes will soon die out in the wild unless steps are taken now to protect them.

Gorillas and orangutans appear to have no natural enemies, and chimpanzees have very few. Gibbons, because they move so fast and live so high up in the trees, are safe from any animal. Nothing could threaten any of the apes with extinction until man started hunting them, capturing them, and destroying the wild lands in which they live.

Today, hunting of apes is against the law everywhere, and there are strict regulations controlling the capture of wild apes. But illegal hunting and trapping continues. And the greatest threat of all -- the destruction of wild lands -- grows greater every day. Tropical forests are being cut down faster today than ever before ... at the rate of one acre every second, according to a recent report. At this incredible pace, the homes of many wild creatures -- including apes -- are simply disappearing.

Most endangered of the apes are the mountain gorillas. Today, there are less than 500 in Central Africa.

And the other apes are not much better off. Nobody is really sure how many pygmy chimpanzees or bonobos survive in the jungles south of the Congo River -- but it is probably less than 10,000. There are fewer than 5,000 orangutans still alive in scattered areas of Borneo and Sumatra. And the numbers of lowland gorillas and chimpanzees are declining rapidly.

Fortunately, there are people who are trying to save the magnificent apes. In Central Africa, governments are working to protect the last remaining homes of mountain gorillas. They have even organized guards that patrol the borders of gorilla preserves to keep the gorillas safe from hunters. The World Wildlife Fund and other groups are raising money to buy land and make sure that it will never be taken away from gorillas, chimpanzees, orangutans, and gibbons. And scientists everywhere are studying the apes to find new ways to help them.

BONOBO OR PYGMY CHIMPANZEE

Biologists who have studied the behavior of these animals say they are the smarter of two species of chimpanzees. Their hair is parted at the middle and wisps out to the sides of the head, giving them an obvious physical distinction from the common chimpanzee.

Both species of chimps are intelligent. They belong to the select animals that make and use tools. You might see a chimp defend himself with a tree branch, or take a twig and turn it into a useful devise for gathering or eating foods. Chimps also communicate with many gestures and vocalizations.

People may feel especially drawn to chimps because of some similar behaviors. Young chimps laugh when they're tickled. Bonobos quarrel over food, but hug and kiss to make up.

BONOBO: WORKSHOP IN CONSERVATION

The bonobo or pygmy chimpanzee, is one of only four living species of great apes. The other three species, the gorilla, orangutan, and common chimpanzee, have received far greater attention until now. Not even recognized as a separate species until 1929, the bonobo still remains much of a mystery in its native habitat, the central rain forests of Zaire. Often confused with the common chimpanzee, the bonobo is only slightly smaller but has a more graceful, slender body; the head is smaller but the legs are longer than those of common chimps. The most outstanding physical difference is the bonobo's hairstyle, an attractive coiffure of long black hairs neatly parted down the middle. To the experienced eye, the difference between the chimpanzee and the bonobo is as great as the difference between a leopard and a cheetah.

The bonobo is as rare in zoos (there are less than 80 in captivity worldwide) as it is in the wild (estimates range from 5,000 to 20,000). In 1989, the entire San Diego Zoo group of 11 animals was relocated to the Wild Animal Park.

No effective conservation plan for the bonobo could be developed without firsthand knowledge of the only country that is home to this critically endangered ape. International conservation projects are as much a people issue as an animal issue; therefore, the needs of the local Zairian people must be taken into account. Political, cultural, and economic problems are just as important to consider as the biological needs of the species we are attempting to save. For these reasons, the San Diego Bonobo Workshop continually emphasizes the need for an international cooperative effort with the people and government of Zaire.

In light of the increasing awareness of the need to preserve the world's biodiversity, it is quite surprising how little attention Zaire has received. The extent and variety of the biological resources in Zaire's forest ecosystems is matched by few other tropical countries. After Brazil, Zaire has the second largest tropical forest in the world. Despite this fact, Zaire is among the last of the countries in the tropical forest belt without a comprehensive program to protect its tropical forest. Programs like the one developed at the San Diego Bonobo Workshop will be instrumental in obtaining funds from organizations like the World Bank to protect the bonobo and its forest habitat.

THE GORILLA SUBSPECIES

Three subspecies of gorillas are currently recognized. Almost all zoo gorillas are western lowland gorilla (Gorilla gorilla) native to west African nations such as Cameroon, the Central African Republic, Gabon, Nigeria, and Rio Muni. The total population of western lowland gorillas is estimated to be between 30,000 to 50,000 individuals, and they are classified as threatened by the IUCN (International Union for Conservation of Nature and Natural Resources). Studying these gorillas in the wild is extremely difficult, because their preferred habitat is dense jungle.

A very few eastern lowland gorillas (Gorilla gorilla graueri) native to eastern Zaire, live in zoos. Mbongo and Ngagi, the two "mountain gorillas" who lived at the San Diego Zoo in the 1930s and 1940s, would now be classified as eastern lowland gorillas. These gorillas are considered the largest subspecies on average, and generally have blacker hair than western lowland gorillas. They number approximately 3,000 to 4,000 and are classified as endangered.

No mountain gorillas (Gorilla gorilla beringei) exist in captivity, but these are the most-studied gorillas in the wild. They live in the mountainous border regions of Rwanda, Uganda, and Zaire. Only about 600 individuals exist, in two separate populations, and they are classified as endangered. Mountain gorillas are distinguished physically by their large size and extra-long, silky black hair. A number of skeletal differences exist between the three subspecies as well.

It would be interesting to see if DNA sequence comparisons could help us understand the phylogenetic (evolution of a genetically related group as distinguished from the development of the individual organism) relationships of the gorilla subspecies. This could help anthropologists understand the mechanisms and rates of primate evolution. It could also be important if gorilla populations ever become so critically depleted that interbreeding of different subspecies were contemplated. At CRES, we are comparing DNA sequences from gorillas of all three subspecies. Only a few gorillas have been tested so far, but to date it appears that the relationships between the subspecies generally follows the geographic location of populations.

Western lowland gorillas have a large range, and many DNA sequence differences exist between different individuals of this subspecies. Western lowland gorillas are separated by 600 miles from eastern lowland gorillas, and substantial sequence differences exist between the two groups as well. The eastern lowland and mountain gorilla populations are found relatively close together, but they have been isolated from each other for an unknown amount of time. They are presently separated by substantial geographic barriers: portions of the Rift Valley and a variety of mountain ranges. However, we find much less genetic difference between the eastern lowland gorillas and the mountain gorillas than there is between certain western lowland gorillas. The distinct physical differences between eastern lowland and mountain gorillas probably reflect recent adaptations to their respective habitats -- lowlands versus mountains -- and not a distant genetic relationship.

LION-TAILED MACAQUES: BACKGROUND

The macaques, a genus of some 13 to 20 species (there is disagreement among taxonomists on the actual number), are found in North Africa and throughout southern Asia from Afghanistan to Japan. The most familiar form is the rhesus monkey, which is often seen by tourists in the towns and cities of India. Fossils dating to six million years indicate that the macaques originated in northern Africa and once roamed over Europe as far north as London. These earlier macaques were not very different in appearance from the Barbary monkeys that survive today in Morocco, Algeria, and on Gibraltar. However, once the Macaques reached Asia, at least by three million years ago, they diversified into a variety of forms. Few are as distinctly different as the lion-tails, with their black coats, silver facial ruffs, and strongly arboreal habitats. Lion-tails are one of the two macaque species that are listed as in danger of extinction, but we may realistically expect the Tibetan, Formosan, and Sulawesian species to fall into that category before the year 2000.

Their geographical range snakes along the slope's and highest crests of the Western Ghat Mountains where, today, the forest is reduced to about one percent of the total land cover. Like its captive counterpart, the wild living lion-tail was ignored by primatologists until well into the 1970s. Although opinions vary, most would agree that the wild population today numbers between 2,000 and 5,000 individuals. Initial field reports indicate that wild lion-tails prefer to spend about 99 percent of their time in the trees. Like other macaques, their diet is dominated by wild fruits, but includes a variety of flowers, leaves, buds, grasses, insects, and even a few nestlings of birds and mammals. One of the more interesting forms of feeding reported by Dr. Steven Green of Miami University involves a simple form of tool use. In order to protect their hands while feeding on stinging caterpillars, lion-tails have been seen to pluck large tree leaves and lay them over the caterpillars before pouncing on them.

In the wild state, lion-tail groups average about 20 individuals, usually with more than a single adult male present. Males are larger than females by about a third and are typically ranked relative to one another in a social hierarchy. Males usually emigrate from their natal group to join another during the early stages of adulthood. Being macaques, lion-tails are intensely social and are highly aggressive toward unfamiliar individuals. Preliminary work on our captive population indicates that much of the behavior between group members is dependent upon one's relationship to a small number of female-headed lineages. It is possible to have up to four living generations within each matriline and four or five matrilines within a group. Dominance relationships among and within matrilines play a crucial role in the everyday life of females and their offspring, as they do for adult males. One's social position determines access to essential resources such as food, perches, and social partners.

LION-TAILED MACAQUES: FUTURE PLANS

This highly endangered primate has been exhibited at the San Diego Zoo since 1923. In 1979, the existing population of three males and three females was relocated to the Primate Research Pad for concentrated study of their reproductive biology. Within the next decade their reproductive cycles were characterized, as were their sexual and social behavior, parturition and infant rearing, and various other aspects of the captive experience. Nearly a dozen scientific papers from these studies have been published in peer-reviewed journals or as book chapters.

BY 1989 the Zoo's captive population had grown to 38 individuals. This same year the program undertook a significant change in direction. Seven individuals, including five born at the Primate Research Pad, were released into a state-of-the-art exhibit in Sun Bear Forest. Although these individuals are no longer under study, it was knowledge gained over the previous decade that contributed to the design of an exhibit facility which, by anyone's criteria, is an outstanding success.

A second troop of 11 individuals was simultaneously relocated to the newly constructed 3/4-acre breeding kraal at the Wild Animal Park. It is this population which will be a major research focus during the next five years. This troop has been exempted from Species Survival Plan management, a program of the American Association of Zoological Parks and Aquariums, providing freedom to pursue several interesting lines of inquiry. One of these has to do with the impact of traditional management regimes on certain life history parameters. The second investigation will pursue experiments designed to prepare the troop for reintroduction to suitable habitat in India in five to seven years.

The lion-tailed macaque is by nature a highly social mammal. Group members are organized in a social hierarchy that appears to remain stable over many years. Individual troops are highly xenophobic. This trait, combined with natural aggressiveness, results in potentially fatal conflict when new individuals are introduced. In the wild state, males will leave their natal troop at sexual maturity and join a new one. Females remain in their natal troops throughout their lives.

Transfer by males is accompanied by a substantial amount of aggression, but is presumably a necessary event to preclude inbreeding. These natural attributes of wild troops would seemingly have profound implications for the transfer of individuals, especially of females, between zoological institutions to satisfy genetic and reproductive objectives.

It is relevant to ask if the ongoing disturbance of the social order through frequent inter-institutional transfers might negatively impact on such parameters as infant mortality, female fecundity, and perhaps even the neonatal sex ratio. Our kraal group has been together for the past 24 years, the only social disturbances having been the replacement of breeding males. We have learned how to integrate new males into groups with a minimum of social upheaval. We therefore have a unique opportunity to compare findings from our relatively undisturbed population with those from more traditionally managed populations in other zoos over the next several years.

Preparation of this same troop for reintroduction to the wild has two components. The first entails a number of experimental procedures designed to "teach" natural foraging, avoidance of predators (including humans), and appropriate social cohesiveness. In addition, the troop must be routinely evaluated for any pathogens that would pose a hazard to the existing wild population.

The second component is evaluation of potential release sites in the wild. The area selected for a test-case reintroduction must not only be protected from human activity, but must contain adequate food and shelter to insure the long-term survival of the troop. CRES anticipates working closely with Indian colleagues on this aspect.

NIGHTTIME IS THE NORM: LABOR AND BIRTH IN THE LION-TAILED MACAQUE

Lion-tailed macaque neonates (newborns) are born with black fur, and their faces, hands, and feet are pink and hairless. Their characteristic silver manes do not begin to grow in until the babies are several weeks old, and their faces gradually acquire the black pigmentation of adults.

When the lion-tailed macaque breeding and management program began at the CRES primate facility more than ten years ago, little was known about the gestation, labor, and delivery of infants in this species. There was extensive documentation of parturition in some other macaques, but no comparable data were available on the much rarer lion-tailed macaque. How long is the normal gestation length? At what time are births most likely to occur? How long does labor last? What factors indicate that there may be a delivery problem requiring veterinary intervention? Answers to these and other important questions were needed in order to ensure the best captive management procedures and to maximize the breeding success for this species.

The primary reason these data had not been collected previously is that most new infants were usually discovered in the morning, after the keepers arrived at work. We began collecting data on each lion-tailed macaque birth by setting up 24-hour "birth watches" that began several days before the dam was due to deliver. Conception dates were determined partially through hormone data from daily urine samples, and also by keeping careful track of menstruation, sex-skin swellings, and mating episodes. Parturition-date predictions were based on the 168-day gestation length documented for the rhesus macaque. However, because this is an average length, we began our observations about ten days before the due date in order not to miss the early deliveries.

The birth watch involved round-the-clock observations at 15-minute intervals during successive, 4-hour shifts. Observations were recorded by keepers, technicians, and trained volunteers. As soon as any signs of straining or birth fluids were noted, continuous notes were kept and each subsequent contraction or birth-related event was timed and recorded. Behavioral indications of impending labor included restlessness and manual exploration of the vaginal area. Although these signs eventually proved reliable, we used the first, clear contraction as the starting point for measuring the duration of labor. (In human terms, this is equivalent to second-stage labor. The usual criterion of first-stage labor, cervical dilatation, cannot be observed in the wild primate unless restraint is used.) During actual labor, several straining postures were noted; most common were variations of squatting postures and arched-back stretches.

The first birth was to an experienced mother (this was her third delivery) and was documented on videotape. After nearly 8 full hours of labor and 188 contractions, the dam gave birth to a healthy, female infant. These initial observations led us to believe that a labor of this duration was not a basis for concern; however, we soon learned that this was far beyond the average labor length and number of contractions common for this species.

Over an 8-year period, we were able to collect data on 18 births from 8 different mothers in our colony. Our program has provided some valuable information about species-typical birth patterns that we can now use to direct management decisions. We found that the average length of labor to expulsion of the fetus was about 2 hours and 15 minutes, and the shortest labor was only 50 minutes total. The female that required eight hours to deliver in the first case observed then delivered her subsequent infant in only a little over an hour! Although our sample is still small, it would appear that, on the average, first-time mothers have longer and more difficult labors.

Our study determined that the average number of contractions to delivery for lion-tails was 54. The female with the longest labor also had the largest number of contractions (454). In her next delivery, the infant arrived after only 14 contractions, the lowest number recorded during the entire birth study. Based on the average number of contractions seen in 17 successful deliveries, and one ending in stillbirth, contraction frequencies approaching 75 to 100 in number may serve as a warning that intervention will be necessary.

The average length of gestation for 14 pregnancies in our colony was 169.5 days, with a range of 163 to 176 days. This is very similar to what has been reported for other macaques. Our observers quickly discovered that those who watched during the 7 to 11 P.M. shifts were the most successful at being present when births occurred: labor began between the hours of 7:15 P.M. and 3:15 A.M. in every case but one. The exception was one first-time mother that began straining in the early afternoon. This female had a difficult labor, and a dead fetus was later removed by cesarean section after 8 hours of straining and 193 contractions. All the other births resulted in live offspring and occurred between the hours of 8:05 P.M. and 6:28 A.M. Based on previous primate birth records, daytime births are not the norm and may indicate an increased risk to both fetus and dam.

Expulsion of the placenta always took place within about 20 minutes after parturition, and usually it was immediately consumed by the mother. In a few cases, first-time mothers carried the placenta around for several hours, along with the infant, until it could be removed by keepers. Whenever possible, a sample of the placenta is saved for analysis by Zoo pathologists, who check it for abnormalities. After delivery, the mothers carefully lick the birth fluids off their infants, and the neonates begin nursing within a few hours. Each and every female in the study provided excellent maternal care immediately following parturition.

The lion-tailed macaque breeding colonies are now located in the Sun Bear Forest exhibit at the Zoo (one adult male and six females) and in a large, off-exhibit kraal at the Wild Animal Park (one adult male, two juvenile males, one infant male, and ten females). Together these represent the largest captive group of lion-tailed macaques in the world -- about 20 percent of the total captive population. Eight years of patient monitoring, birth watches, record keeping, and evaluation have brought us a long way in the breeding and captive management of this macaque species.

ZOONOOZ, May, 1990 "Nighttime Is the Norm: Labor and Birth in the Lion-tailed Macaque," by Helena Fitch-Snyder, Animal Behavior Specialist/CRES and Donald Lindburg, Ph.D. Behaviorist/CRES.

MORE ON IGUANAS

The environment in which a lizard lives may determine how easily its scent marks can be located by other lizards. Both desert iguanas (Dipsosaurus dorsalis )and green iguanas (Iguana iguana) possess femoral glands on the underside of the hind legs. They use pheromone secretions from these glands to mark their territories. Desert iguanas live in extremely hot and arid habitats, whereas green iguanas live in humid tropical forests. Because these two species of lizards live under such different environmental conditions, it is not surprising that the way their pheromone signals are transmitted differs.

Desert iguanas have scent marks that are nonvolatile, which means that they evaporate very slowly into the atmosphere. These marks are also extremely resistant to chemical breakdown at high temperatures. The low volatility and thermal stability of desert iguana scent marks ensures that they persist under harsh desert conditions, a necessary quality if they are to be used effectively for territory marking. Although these characteristics make scent marks more durable in desert environments, they pose a problem for desert iguanas attempting to detect them if the marks are not volatile; they may be difficult or impossible to locate using smell. Desert iguanas avoid this problem by combining a unique type of visual signal with their scent marks.

One striking property of desert iguana scent marks is that they strongly absorb ultraviolet light. Although these wavelengths are invisible to human eyes, they appear dark to animals able to see ultraviolet light -- much as ultraviolet-absorbing honey guides on flowers look black when UV-sensitive camera film is used to view them. Recent studies have shown that desert iguanas are able to see long-wave ultraviolet light, and they may use this adaptation to detect scent marks from a distance. After scent marks are localized using visual cues, desert iguanas can approach and investigate them in more detail through tongue-flicking. Although it is not known to occur in mammals, visual sensitivity to ultraviolet light has been shown in certain insects, spiders, fish, frogs, and birds. The ability of desert iguanas to detect ultraviolet light may help them solve some of the problems associated with finding scent marks in a desert environment.

In contrast to those of desert iguanas, the scent marks of green iguanas contain a variety of volatile chemical compounds, and they do not absorb ultraviolet light. Behavioral studies indicate that green iguanas, unlike desert iguanas, can detect these scent marks by smell alone. Because the chemical components of green iguana scent marks remain active and transmit well under the humid conditions of tropical forests, green iguanas do not appear to need a visual cue in order to locate scent marks. Research on both iguana species demonstrates how the environment in which animals live can influence the nature of the communication signals they employ.